# A Socio-Technical Analysis of the Interplay between Inter-Organizational Information Technologies and the Network Forms of Inter-Organizational Governance

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## ABSTRACT

Due to rising collaborations among organizations and permeation of various ICT, Inter-organizational information systems (IOS) continue to attract scholarly attentions. The use of IOS technologies enables organizations to engage with other organizations in ways that previously seemed impossible and to present unprecedented inter-organizational arrangements. Despite their importance, little research has been conducted to conceptualize the mutual relationship between IOS technologies and new inter-organizational arrangements that are reflected in inter-organizational governance structures. In this poster, I will identify an emerging gap within the relevant literature. Then, a theoretical foundation will be presented by way of this research problem. Finally, I will discuss possible strategies to empirically investigate the research problem.

## 1. MOTIVATION

The extensive and dynamic business operations conducted by many organizations require an ability to extend external ties and undertake inter-organizational collaborations. At their most basic level, inter-organizational information systems are shared by two or more organizations, and are designed to link business processes [2, 3]. More generally inter-organizational information systems denote the uses of ICT that transcend formal organizational boundaries to provide both structures and flow of information and knowledge among players [4]. IOS technological infrastructures include, but are not limited to Electronic Data Interchange systems (EDI), the Extranets, and the Internet.

A number of studies have investigated the influences of IOS technologies on the inter-organizational structures, and the way organizations conduct inter-organizational transactions. However, Most of these studies adopted a technologically deterministic approach which perceives the IOS technology independent of its organizational and social contexts [5]. This view tends to mask the mutual interdependency of organizations and technologies. [6].

In addition, the limited amount of research which has investigated the broader implications of IOS technological infrastructure has mostly adopted economic or strategic lenses [7]. The dearth of research that leverages other theoretical perspectives, particularly context-aware theories, can obscure our understanding of the relationship between the adoption of IOS technologies and inter-organizational governance structures.

To address the IOS governance, it stands to reason to draw on the network perspective which recognizes the embedded nature of social relations [8]. Certainly, more research is needed to study the mutual constitution of network forms of organization (as an alternative to stylized hierarchy and market) and new IOS technologies that indicates different organizational and social consequences than those of hierarchy-based EDI systems. The contextual insights afforded by network perspective can complement economic perspective and explain how and why technologies are used in practice.

Therefore, the main aim is to conduct an empirical research which seeks to conceptualize the interplay between IOS technological infrastructure and the network forms of inter-organizational governance. To do so, I would draw on socio-technical theories which acknowledge the situated entanglement between technology and social orders, and provide plausible means to account for governance structures.

## 2. THEORETICAL FOUNDATIONS

Since the subjects of my study—IOS technologies and their effects on IOS governance —are a multi-faceted phenomenon and spans multiple levels of analysis, it will be necessary to adopt multiple research perspectives and theories when constructing a conceptual framework. In this section, I will introduce two sets of theories and illustrate how they can contribute to the understanding of the critical aspects of my research problems.

## 2.1 Actor Network Theory

Conceptual insights from Actor Network Theory(ANT), can address the first part of the problem, and provide balanced insights into how IOS technologies and human actors are mutually and emergently productive of one another [6]. ANT theorizes technological networks as embracing not only the human actors but also the physical artifacts and the concepts to which those actors relate [e.g., 9, 10]. At the heart of ANT lies the concept of generalized symmetry which implies that all the heterogeneous elements of a network, both human and non-human, can be explained in the same terms.

Breaking away from social and technological deterministic views, ANT provides precedents for understanding the contribution of both humans and artifacts to the innovation processes. It explains how certain technology constructs the identity of the other actors by making the latter act in accordance with its wishes. Therefore, ANT does not assume an *a priori* relationship between the social and the technical. Latour [10] notes that they can only be understood as inseparable and situated relationships between various human and non-human actors. Therefore, based on the ANT conception, IOS technology should not be considered a set of tools to be used to accomplish some tasks, but are constitutive of both practices and identities.

## 2.2 Institutional Theories

The Scott's [11] layered model of institutions and their environments can account for the second pillar of the research problem which is concerned with the inter-organizational governance structure. This model has a strong resonance with the network perspective.

Scott and Davis [11] - inspired by open-system theory- propose a multi-layer model which directs attentions to events and processes external to organizations [See Figure1]. Among proposed levels, organizational populations, and organizational field are deemed relevant to my study. Organization populations are defined as aggregates of organizations that are similar in some respect. They are clusters of organizations that produce similar products and survive, operate in similar institutional environments and shared the same normative, cognitive and regulatory structures [12]. Organization fields are collections of diverse types of organizations engage in competitive and cooperative relations. The notion of organizations fields essentially exhibits a higher level of environments than organization populations, and denotes structures that are

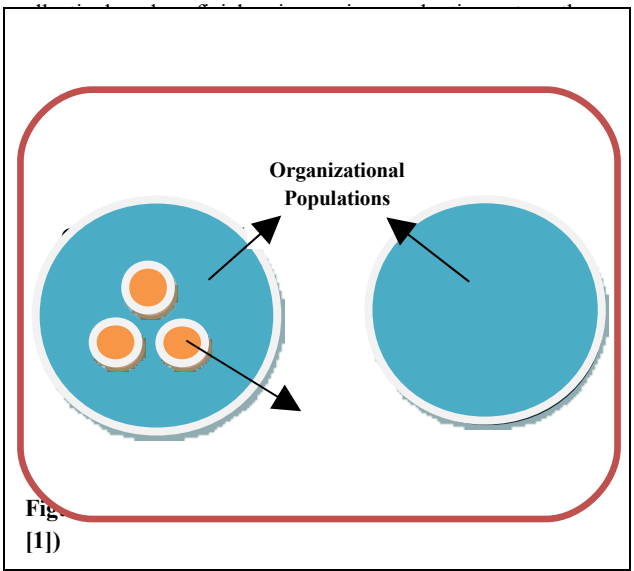


**Fig**
**[1])**

**Organization**

ANT is argued to be sensitive to more micro interactions [13]. As such, the handicap of ANT (regarding broader consequences) can be offset by more macro analyses afforded by Scott's model, which can incorporate IOS effects at inter-organizational level. Finally, institutional view on environmental forces can explain how organizational and inter-organizational contexts shape the uses of IOS artifacts in lower levels. To this end, it relates the organizations or industry structures to ongoing actions of social actors [14].

# 3. SITES SELECTION

There are different plausible ways to select the cases for my proposed study. The following table showcases the disparate combinations based on the two major elements of the research question.

**Table 1. Different site selection strategies**

| | | Governance structure | |
|---|---|---|---|
| | | **Same** | **Different** |
| **IOS Technological infrastructure** | **Same** | **1** | **2** |
| | **Different** | **3** | **4** |

Both option 2 and option 3 look viable for addressing the research questions. Barley [15] has used strategy 2, and studied how an identical CT scanner technology has produced structuring processes and differing forms of organizations in two radiology departments. However, I argue that option 3 could serve my research question better. Leonardi and Barley [16] contend that since the mid-1980s researchers have adopted research designs that compare the use of identical or similar technologies in different context to highlight the role that social context play in shaping the technological consequences. They argue that the agenda of socio-technical researchers should instead turn into the opposite approach: comparing radically different technologies in the same or similar context.

To this end, I would like to study different IOS technologies in *similar* contexts of inter-organizational arrangement that are compatible with our definition of the network form of governance. Within such settings, long-term relationships are sustained while no central point of authority governs them.

This Multiple-case design should include multiple network-oriented inter-organizational settings that share a great deal of commonalties. The cases should also include a constellation of organizations as IOS governance typically includes more than one organization. As Barley asserts: "Not only are organizations suspended in multiple, complex, and overlapping webs of relations, but the webs are likely to exhibit structural patterns that are invisible from the perspective of a single organizations caught in the tangle. To detect overarching structure, one has to rise above the individual firm and analyze the system as a whole." [17 , p. 321 ]

## 4. CONCLUSION

I argue that little is known about the nature and inherent influences of IOS technologies on the inter-organizational governance structure. Hence, explicit considerations of inter-organizational structures and their possible interactions with the IOS artifacts could heighten our understanding about the social and the technical aspects of inter-organizational information systems.

The theoretical frameworks for studying the research problem seem insightful enough to capture the relationships between macro structures and micro dynamics. Through the concept of symmetry, ANT recognizes the fact that IOS technologies are both the products and the shapers of human actions. In this light, our main argument is that viewing technology as fixed artifacts that are to be distributed throughout society impedes understanding, and therefore managing, the often necessary process of mutual adaptation of the social and the technical. In addition, the institutional view directs attentions to macro structures and processes, and hence complements ANT by integrating broader levels of analysis.

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